Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTUR...
FOR WIRELESS......
U.S. Application No.: 09/759,204
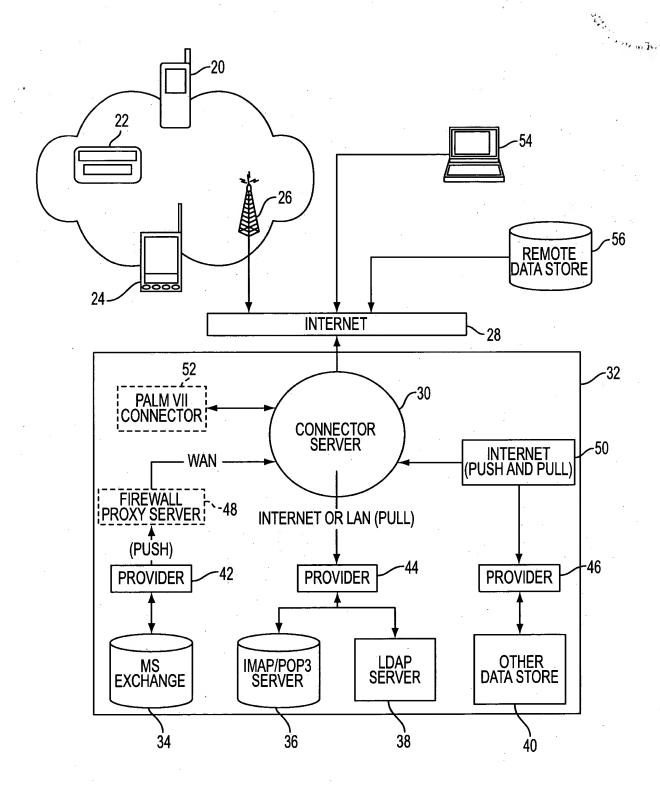Filed: 1/16/01
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FIG. 1

FIG. 2

Inventors: Nathanial X. Freitas, et al.
T● SOFTWARE ARCHITECTURE
FO● WIRELESS......
U.S. Application No.: 09/759,204
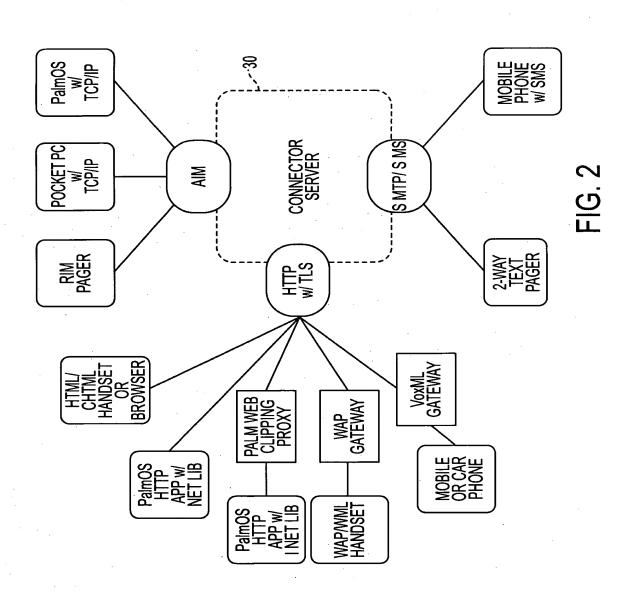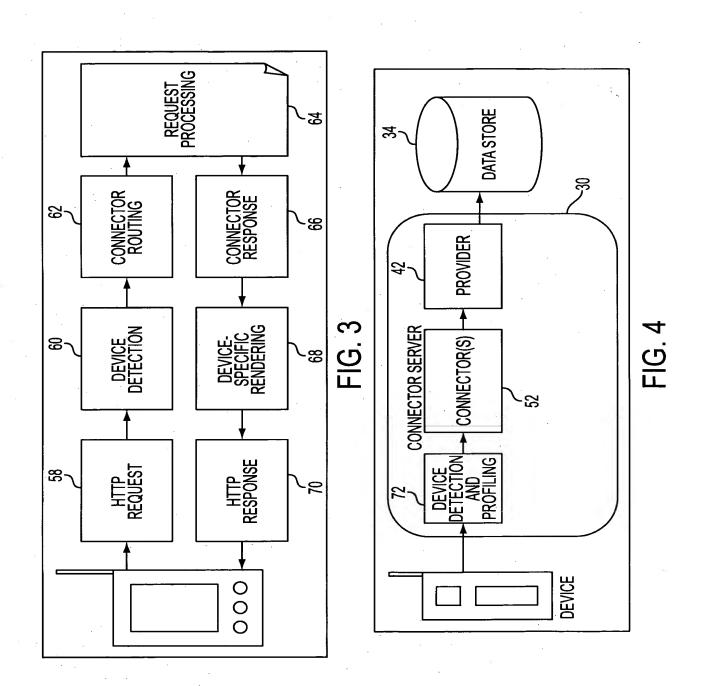Filed: 1/16/01
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FIG. 3

FIG. 4

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
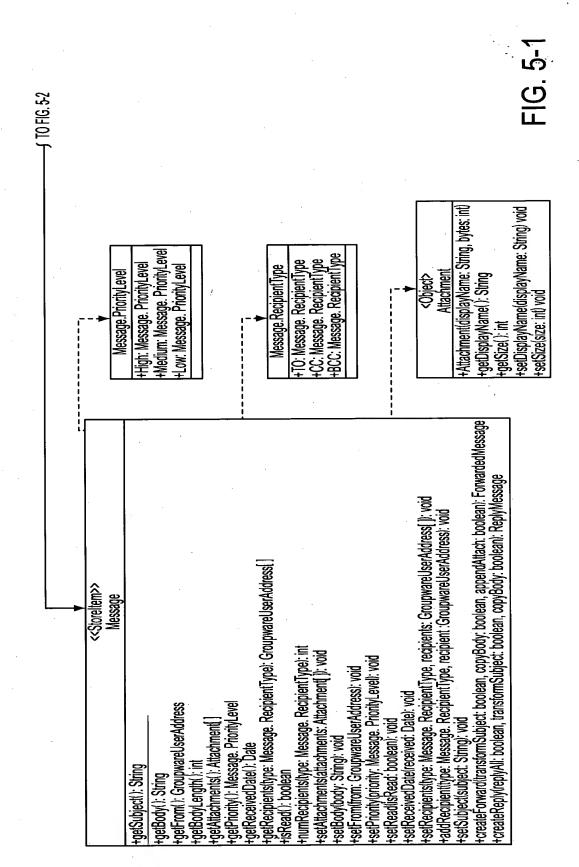Filed: 1/16/01
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FIG. 5-1

Message.PriorityLevel

+High: Message. PriorityLevel
+Medium: Message. PriorityLevel
+Low: Message. PriorityLevel

Message.RecipientType

+TO: Message. RecipientType
+CC: Message. RecipientType
+BCC: Message. RecipientType

**<Object>
Attachment**

+Attachment(displayName: String, bytes: int)
+getDisplayName(): String
+getSize(): int
+setDisplayName(displayName: String) void
+setSize(size: int) void

**<<StoreItem>>
Message**

+getSubject(): String
+getBody(): String
+getFrom(): GroupwareUserAddress
+getBodyLength(): int
+getAttachments(): Attachment[]
+getPriority(): Message. PriorityLevel
+getReceivedDate(): Date
+getRecipients(type: Message. RecipientType): GroupwareUserAddress[]
+isRead(): boolean
+numRecipients(type: Message. RecipientType): int
+setAttachments(attachments: Attachment[]): void
+setBody(body: String): void
+setFrom(from: GroupwareUserAddress): void
+setPriority(priority: Message. PriorityLevel): void
+setReadIsRead: boolean): void
+setReceivedDate(received: Date): void
+setRecipients(type: Message. RecipientType, recipients: GroupwareUserAddress[]): void
+addRecipient(type: Message. RecipientType, recipient :GroupwareUserAddress): void
+setSubject(subject: String): void
+createForward(transformSubject: boolean, copyBody: boolean, appendAttach: boolean): ForwardedMessage
+createReply(replyAll: boolean, transformSubject: boolean, copyBody: boolean): ReplyMessage

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
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Event.AttendeeType
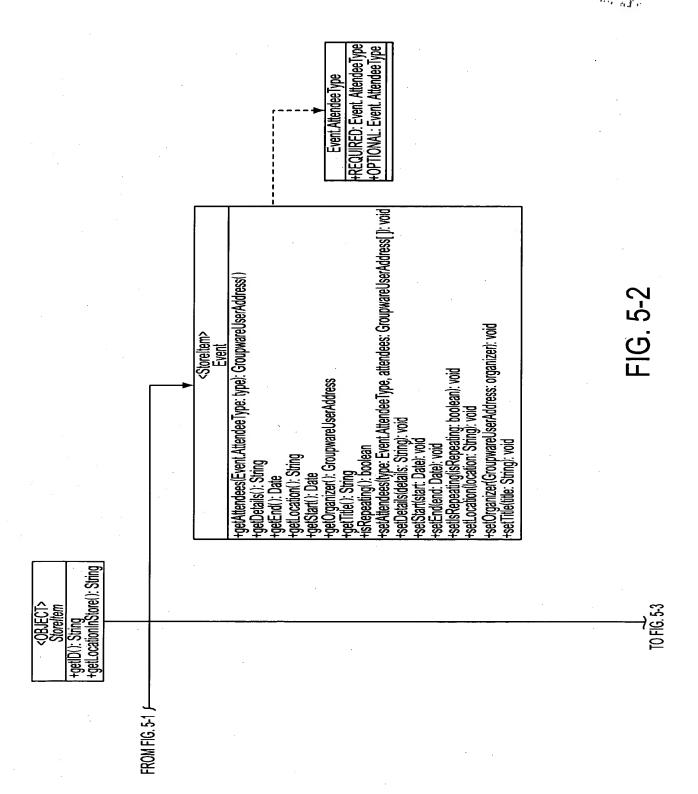
+REQUIRED: Event. AttendeeType
+OPTIONAL: Event.AttendeeType

<StoreItem>
Event

+getAttendees(Event.AttendeeType: type): GroupwareUserAddress( )
+getDetails(): String
+getEnd(): Date
+getLocation(): String
+getStart(): Date
+getOrganizer(): GroupwareUserAddress
+getTitle(): String
+isRepeating(): boolean
+setAttendees(type: Event.AttendeeType, attendees: GroupwareUserAddress[]): void
+setDetails(details: String): void
+setStart(start: Date): void
+setEnd(end: Date): void
+setIsRepeating(isRepeating: boolean): void
+setLocation(location: String): void
+setOrganizer(GroupwareUserAddress: organizer): void
+setTitle(title: String): void

<OBJECT>
StoreItem

+getID(): String
+getLocationInStore(): String

FROM FIG. 5-1

TO FIG. 5-3

FIG. 5-2

Inventors: Nathaniel X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
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FROM FIG. 5-2

TO FIG. 5-4

TO FIG. 5-4

TO FIG. 5-4

<StoreItem>
Contact

+getCompany(): String
+getDetails(): String
+getEmailAddresses(): Contact. EmailAddress[ ]
+getFirstName(): String
+getLastName(): String
+getFullName(): String
+getJobTitle(): String
+getPhoneNumbers(): Contact. Phone Number[ ]
+getPhysicalAddresses(): Contact. PhysicalAddress[ ]
+getWebsite(): String
+setCompany(company: String): void
+setDetails(details: String): void
+setEmailAddresses(addresses: Contact. Email Address[]): void
+setFirstName(firstName: String): void
+setLastName(lastName: String): void
+setFullName(fullName: String): void
+setJobTitle(jobTitle: String): void
+setWebsite(url: String): void
+setPhoneNumbers(phoneNumbers: Contact. PhoneNumber[]): void
+setPhysicalAddresses(addresses: Contact. PhysicalAddress[]): void

Post

+getAttachments(): Attachment[]
+getBody(): String
+getPostedDate(): Date
+getPoster(): GroupwareUserAddress
+getSubject(): String
+isRead(): boolean
+setAttachments(attachments: Attachment[]): void
+setBody(body: String): void
+setPostedDate(posted: Date): void
+setPoster(poster: GroupwareUserAddress): void
+setRead(isRead: boolean): void
+setSubject(subject: String): void

Task.PriorityLevel

+HIGH: Task. PriorityLevel
+NORMAL: Task. PriorityLevel
+LOW: Task. PriorityLevel

<object>
GroupwareUserAddress

+GroupwareUserAddress(type: String, display: String, address: String)
+getAddress(): String
+getType(): String
+getDisplayName(): String
+setAddress(): String
+setType(): String
+setDisplayName(): String

GroupwareUserSMTPAddress

+GroupwareUserSMTPAddress(display: String, address: String)

<StoreItem>
Task

+addAssignedTo(assignee: GroupwareUserAddress): void
+getAssignedTo(): GroupwareUserAddress[]
+getCompletion(): int
+getCompletion(): int
+getDetails(): String
+getDueDate(): Date
+getPriority(): Task. PriorityLevel
+getStartDate(): Date
+getTitle(): String
+setAssignedTo(assignedTo: GroupwareUserAddress[]): void
+setCompletion(percent: int): void
+setDetails(details: String): void
+setDueDate(dueDate: Date): void
+setPriority(priority: Task. PriorityLevel): void
+setStartDate(start: Date): void
+setTitle(title: String): void

FIG. 5-3

FROM FIG. 5-3

Contact.EmailAddress
+Contact. EmailAddress(description: String, address: GroupwareUserSMTPAddress) +getAddress( ): GroupwareUserSMTPAddress +getDescription( ): String

FROM FIG. 5-3

Contact.PhysicalAddress
+HOME_DESC: String +WORK_DESC: String +OTHER_DESC: String
+Contact. PhysicalAddress(description: String, street1: String, street2: String, city: String, state_prov: String, zip_postal: String, country) +getCity( ): String +getCountry( ): String +getDescription( ): String +getStateProv( ): String +getStreet1( ): String +getStreet2( ): String +getZipPostal( ): String

FROM FIG. 5-3

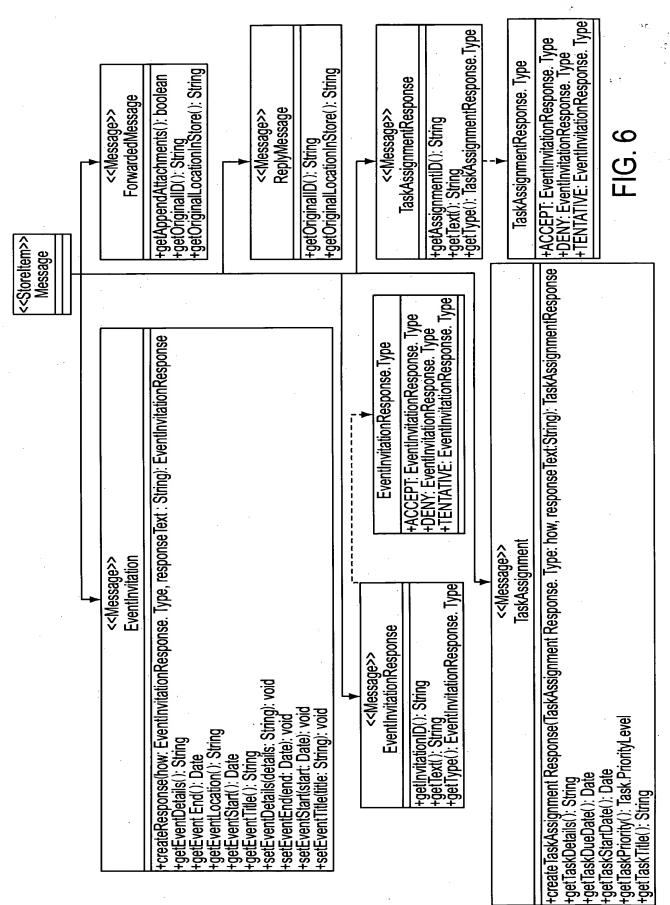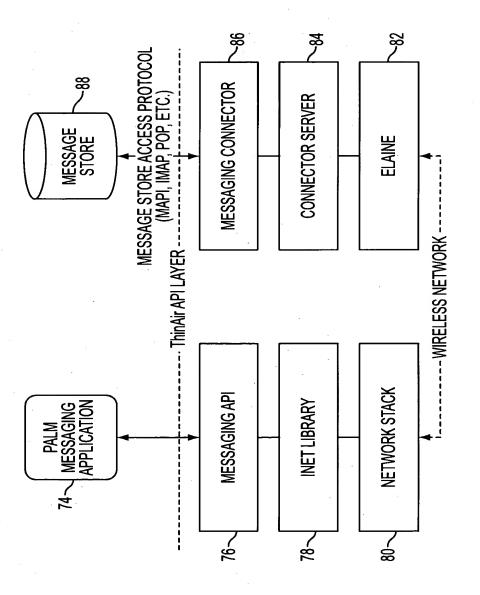| Contact.PhoneNumber |
| --- |
| +ASSISTANT_DESC: String
+CALLBACK_DESC: String
+CAR_DESC: String
+CELL_DESC: String
+COMPANY_DESC: String
+HOME_DESC: String
+HOME2_DESC: String
+HOMEFAX_DESC: String
+ISDN_DESC: String
+OTHER_DESC: String
+PAGER_DESC: String
+PRIMARY_DESC: String
+RADIO_DESC: String
+TELEX_DESC: String
+TTY_DESC: String
+WORK_DESC: String
+WORK2_DESC: String
+WORKFAX_DESC: String |
| +Contact. PhoneNumber(description: String, number: String)
+getDescription( ): String
+getNumber( ): String |

FIG. 5-4

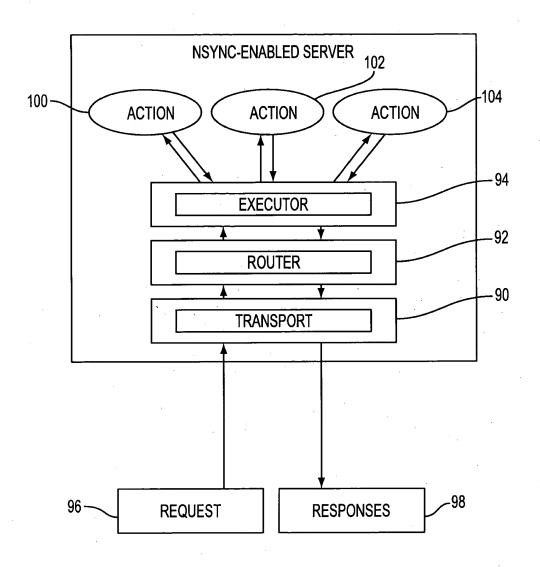Inventors: Nathanial X. Freitas, et al.
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FOR WIRELESS……
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FIG. 6

MESSAGE STORE 88

MESSAGE STORE ACCESS PROTOCOL
(MAPI, IMAP, POP, ETC.)

ThinAir API LAYER

MESSAGING CONNECTOR 86

CONNECTOR SERVER 84

ELAINE 82

WIRELESS NETWORK

PALM MESSAGING APPLICATION 74

MESSAGING API 76

INET LIBRARY 78

NETWORK STACK 80

FIG. 7

NSYNC-ENABLED SERVER

102

100 — ACTION   ACTION   ACTION — 104

EXECUTOR — 94

ROUTER — 92

TRANSPORT — 90

96 — REQUEST   RESPONSES — 98

FIG. 8

```
                    ┌──────────────────┐
                    │     SERVLET      │──108
                    └──────────────────┘
                             ▲
                             │
        ┌─────────────────────────────────────┐
        │  3RD PARTY JAVA SERVLET CONTAINER    │
        └─────────────────────────────────────┘

        ┌─────────────────────────────────────┐
        │       3RD PARTY HTTP SERVER          │
        └─────────────────────────────────────┘
```

HTTP TRANSPORT CORE ──106

EXECUTOR ──94
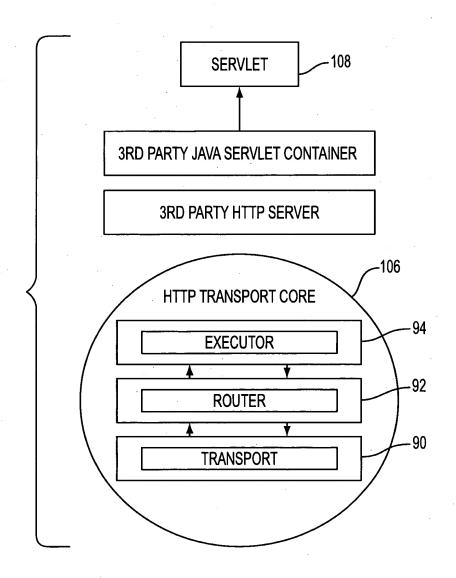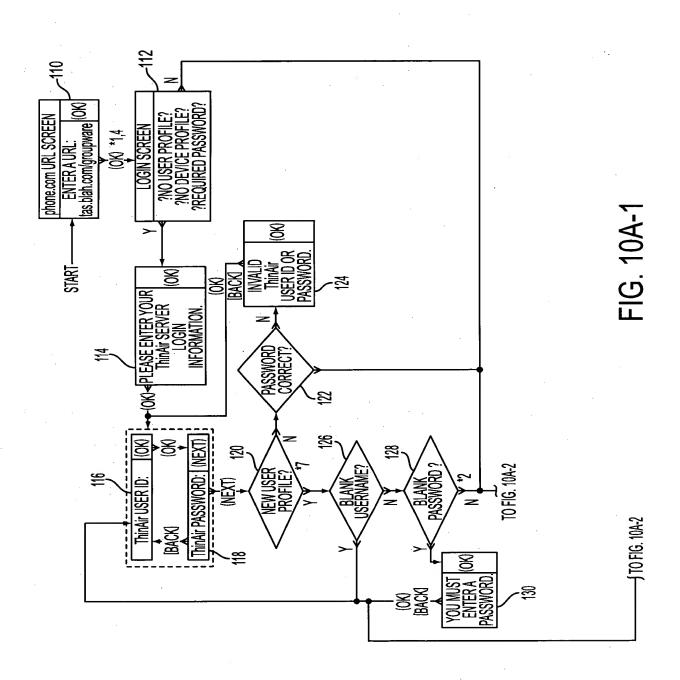
ROUTER ──92

TRANSPORT ──90

FIG. 9

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FIG. 10A-1

FIG. 10A-2

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FIG. 10B-1

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
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U.S. Application No.: 09/759,204
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FIG. 10B-2

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
Filed: 1/16/01
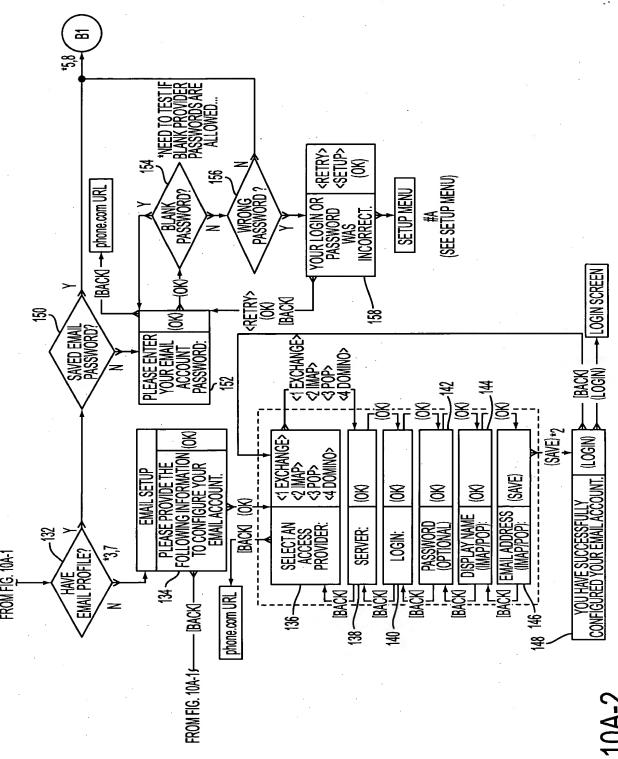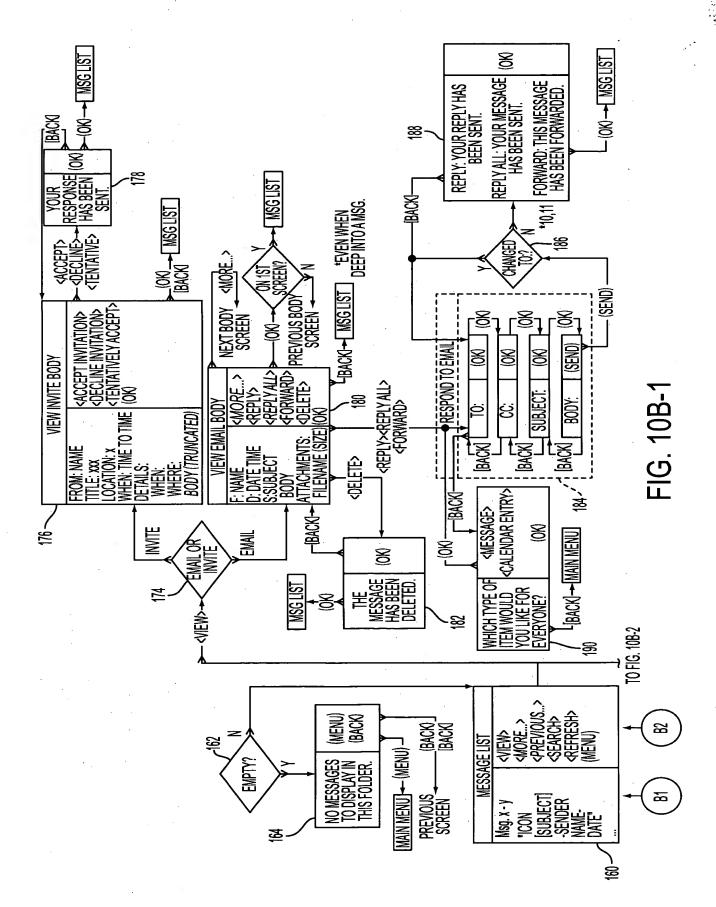Sheet 16 of 25

C1 → EMPTY? 202

Y / N

204 — THERE ARE NO ITEMS TO DISPLAY. | (MENU) (OK)

MainMenu ← (MENU) (OK) [BACK]

206 — CALENDAR LIST

| [TIME: SUBJECT] | <VIEW> <MORE...> (OK) (MENU) |

—<VIEW>→ VIEW CALENDER ITEM

| ORGANIZER: NAME TITLE: TEXT LOCATION: TEXT WHEN : TIME TO TIME BODY (TRUNCATED) ATTENDEES: NAMES | (OK) | — 216

CAL LIST ← [BACK] (OK)

—<MORE...>→ ON LAST SCREEN? 212

NEXT CAL SCREEN ← N

Y →

PREV CAL SCREEN ← [BACK] (OK)

THERE ARE NO ITEMS TO DISPLAY. | (MENU) (OK) — 214

MainMenu (MENU)

—(OK) [BACK]→ ON FIRST SCREEN? 208

MainMenu ← Y

PREV CAL SCREEN ← N

—(MENU)→ MainMenu — 210

FIG. 10C-1

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
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FIG. 10C-3

FIG. 10C-2

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
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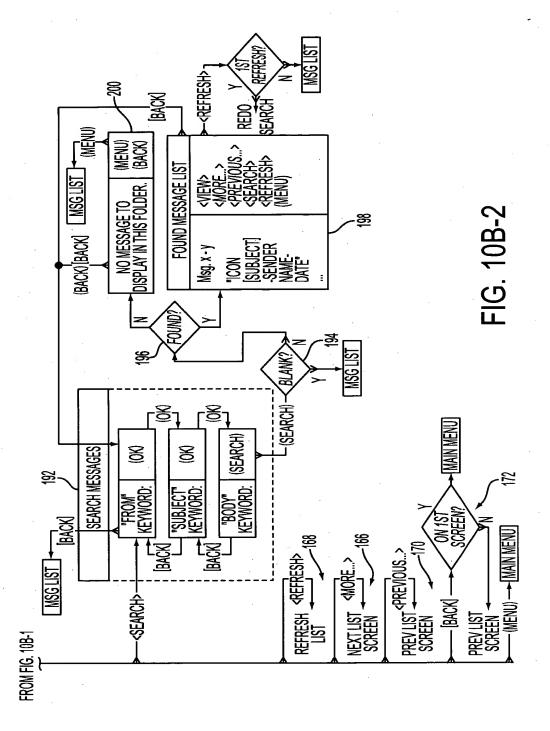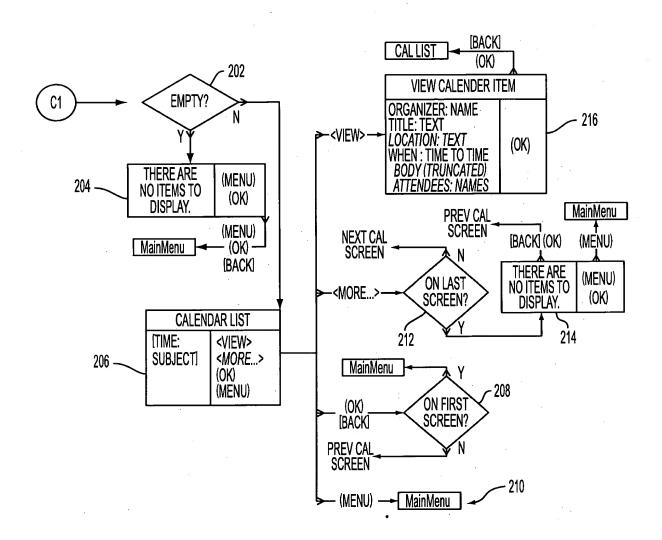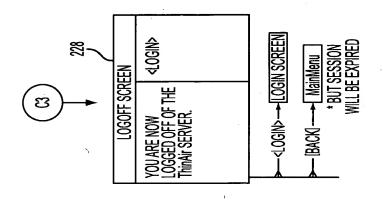FIG. 10D-1

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Title: SOFTWARE ARCHITECTURE
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FROM FIG. 10D-1

MAIN MENU

(MENU)

242

SEARCH BY NAME:

(OK)

<SEARCH>

[BACK]

PREVIOUS CONTACT LIST SCREEN

(OK)

NO INPUT.

CONT LIST

(OK)
[BACK]
<SEARCH>

MAIN MENU

(MENU)

244

THERE ARE NO ITEMS TO DISPLAY.

<SEARCH>
(MENU)
(OK)

NOT FOUND.

FOUND.

SEARCH CONTACTS LIST

[FULL NAME]

<VIEW>
<MORE>
<SEARCH>
(OK)
(MENU)

246

(OK)
[BACK]

FIG. 10D-2

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
OR WIRELESS......
U.S. Application No.: 09/759,204
Filed: 1/16/01
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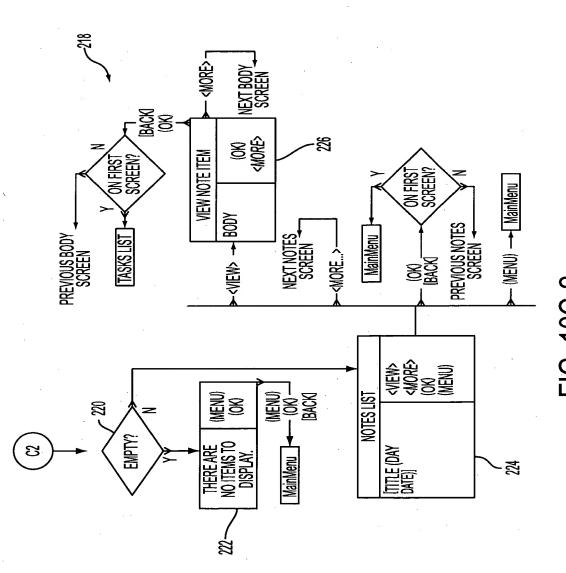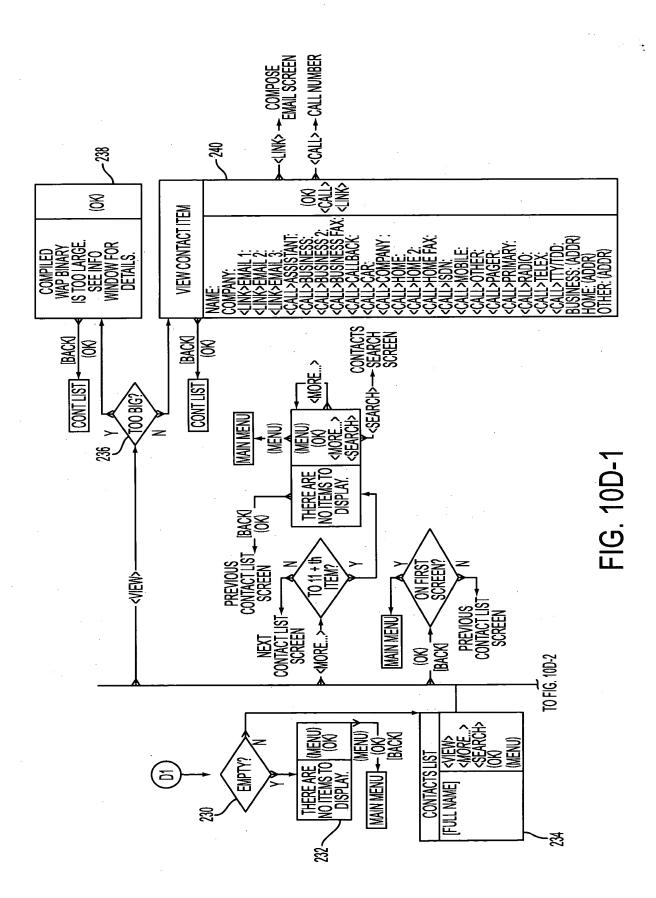
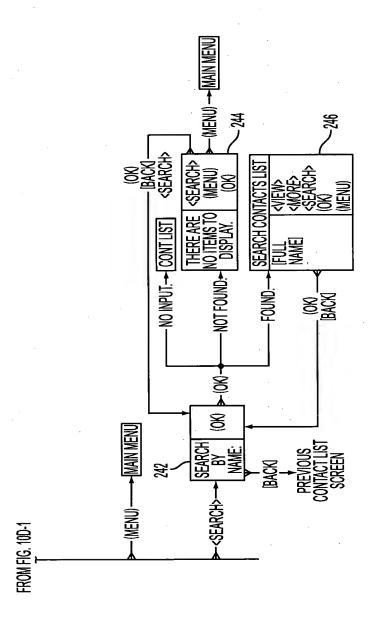FIG. 10E

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Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
U.S. Application No.: 09/759,204
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‹MESSAGES› ⟶ B2

‹CALENDAR› ⟶ C1

‹CONTACTS› ⟶ D1

‹TASKS› ⟶ G1

‹NOTES› ⟶ C2

‹COMPOSE› ⟶ E1

‹BROWSE FOLDERS› ⟶ G2

‹LOGOFF› ⟶ C3

‹SETUP› ⟶ H1

MAIN MENU
‹MESSAGES›
‹CALENDAR›
‹CONTACTS›
‹TASKS›
‹NOTES›
‹COMPOSE›
‹BROWSE FOLDERS›
‹LOGOFF›
‹SETUP›
(OK)

—268

(OK) ⟶ PREVIOUS
[BACK]   SCREEN

LEGEND	
ON SCREEN INFO	‹LINK›: ON SCREEN LINK
	(LINK): ON SCREEN CUSTOM SOFTKEY
	[LINK]: OFF SCREEN STATIC HARDKEY

FIG. 10F

272

EMPTY?

Y   N

274

| THERE ARE NO ITEMS TO DISPLAY. | (MENU) (OK) |

| MAIN MENU | (MENU) (OK) [BACK] |

G1

TASKS LIST	
[TITLE] OR ![TITLE (DAY DATE)]	<VIEW> <MORE...> (OK) (MENU)

270

<VIEW>   TOO BIG?   Y

| TASKS LIST | [BACK] (OK) | COMPILED WAP BINARY IS TOO LARGE. SEE INFO WINDOW FOR DETAILS. | (OK) |

282

280   N

	VIEW TASK ITEM	
	TITLE: ASSIGNED: DATE TIME DUE: DATE TIME PRIORITY: LOW, NORMAL, HIGH COMPLETION: x% DETAILS:	(OK)

284

| TASKS LIST | [BACK] (OK) |

MAIN MENU

NEXT TASKS SCREEN

PREVIOUS TASKS SCREEN   [BACK] (OK)

(MENU)

<MORE...>

| TRUE? IF THE 1 +TH ITEM IS DONE. TA WILL IMMEDIATELY THINK THERE ARE MORE SCREENS TO SHOW. | Y | THERE ARE NO ITEMS TO DISPLAY. | (MENU) (OK) |

N

276

278

MAIN MENU   Y

(OK) [BACK]   ON FIRST SCREEN?

PREVIOUS TASKS SCREEN   N

(MENU) → MAIN MENU

FIG. 10G-1

FIG. 10G-2

VIEW CURRENT FOLDER'S CONTENTS

VIEW FOLDER'S CONTENTS

EXPAND FOLDER

SHOW MORE ITEMS IN CURRENT FOLDER

<CONTENTS>

<FOLDER>

<+FOLDER>

<*MORE...>

PREVIOUS FOLDER SCREEN

(BACK)
BACK]

<*CONTENTS>
<FOLDER>
<+FOLDER>
<*MORE...>
(BACK)
(MENU)

FOLDER LIST

288

ON FIRST SCREEN?

290

N

Y

BROWSE MENU

(MENU)

MAIN MENU

<MESSENGERS>
<CALENDAR>
<CONTACTS>
<TASKS>
<NOTES>

(BACK)
BACK]

MAIN MENU

G2

BROWSE FOLDERS MENU

WHICH TYPE OF ITEM?

<MESSENGERS>
<CALENDAR>
<CONTACTS>
<TASKS>
<NOTES>
(BACK)

286

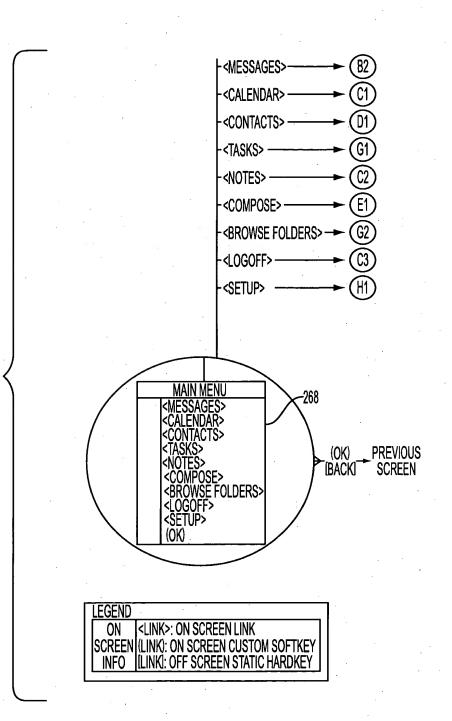Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
FOR WIRELESS......
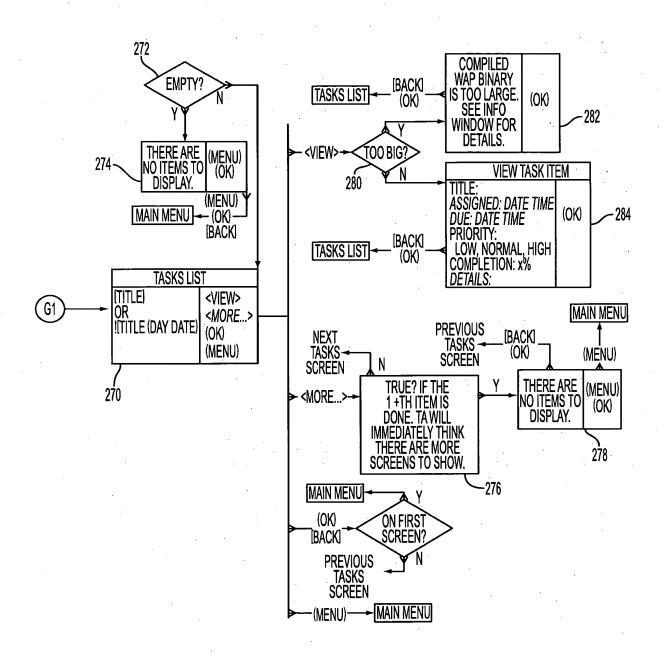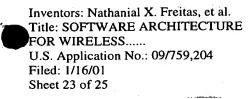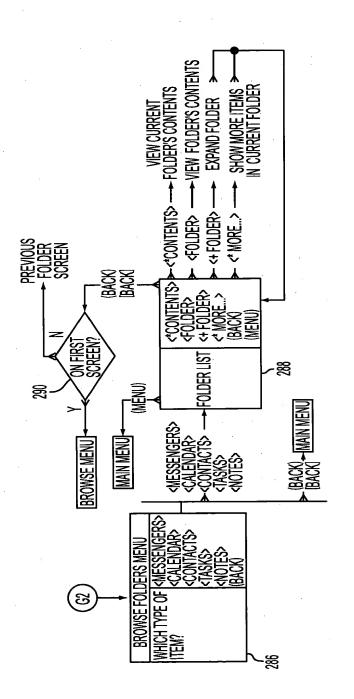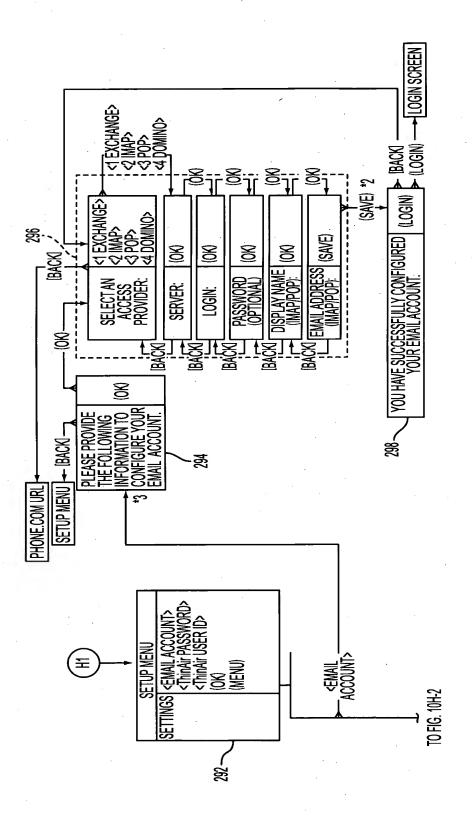U.S. Application No.: 09/759,204
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FIG. 10H-1

Inventors: Nathanial X. Freitas, et al.
Title: SOFTWARE ARCHITECTURE
OR WIRELESS......
U.S. Application No.: 09/759,204
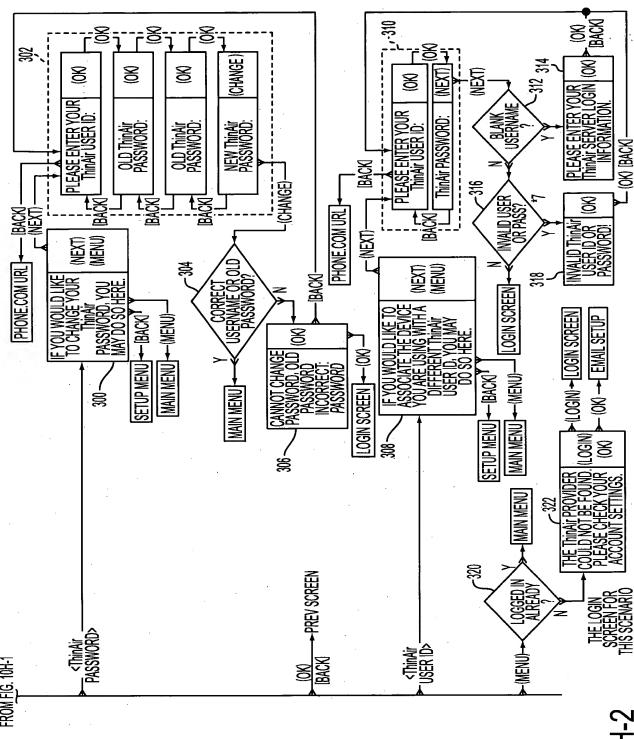Filed: 1/16/01
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FROM FIG. 10H-1

302

PLEASE ENTER YOUR ThinAir USER ID: [OK] [BACK]
OLD ThinAir PASSWORD: [OK] [BACK]
OLD ThinAir PASSWORD: [OK] [BACK]
NEW ThinAir PASSWORD: (CHANGE) [BACK]
(CHANGE)

PHONE.COM URL [BACK] (NEXT)

300
IF YOU WOULD LIKE TO CHANGE YOUR ThinAir PASSWORD, YOU MAY DO SO HERE. (NEXT) (MENU) [BACK] (MENU)
SETUP MENU
MAIN MENU

304
CORRECT USERNAME OR OLD PASSWORD? Y N

MAIN MENU

306
CANNOT CHANGE PASSWORD, OLD PASSWORD INCORRECT. PASSWORD (OK)
LOGIN SCREEN (OK) [BACK]

310
PLEASE ENTER YOUR ThinAir USER ID: [OK] [BACK]
ThinAir PASSWORD: (NEXT) (OK)

PHONE.COM URL [BACK] (NEXT)

312 314
BLANK USERNAME ? Y
N
316
INVALID USER OR PASS? Y
N
*7

PLEASE ENTER YOUR ThinAir SERVER LOGIN INFORMATION. (OK) [BACK]
(OK) [BACK]

318
INVALID ThinAir USER ID OR PASSWORD! (OK)

308
IF YOU WOULD LIKE TO ASSOCIATE THE DEVICE YOU ARE USING WITH A DIFFERENT ThinAir USER ID, YOU MAY DO SO HERE. (NEXT) (MENU) [BACK] (MENU)
SETUP MENU
MAIN MENU
LOGIN SCREEN

LOGIN SCREEN (LOGIN)
LOGIN SCREEN (OK)
EMAIL SETUP

322
THE ThinAir PROVIDER COULD NOT BE FOUND. PLEASE CHECK YOUR ACCOUNT SETTINGS. (LOGIN) (OK)

320
LOGGED IN ALREADY ? Y
N
MAIN MENU

THE LOGIN SCREEN FOR THIS SCENARIO

<ThinAir PASSWORD>
(OK) PREV SCREEN
[BACK]
<ThinAir USER ID>
(MENU)

FIG. 10H-2